

REMARKS**I. Introduction**

In response to the Office Action dated April 9, 2004, Applicants have amended claims 7 and 10 so as to address the pending rejection under 35 U.S.C. § 112, first paragraph, and second paragraph, respectively. Applicants have also amended claims 1 and 12 so as to further clarify the claimed subject matter. Support for these amendments can be found, for example, in Figs. 1-7 and their corresponding section of the specification. Applicants have also **replaced the specification with a substitute specification**, showing renumbered reference character of each element of Figs. 10, 13, 15, 17, 18, 20 and 21 so that these renumbered reference characters are not duplicates of the reference numbers utilized in Figs. 1, 4, 7 and 8. No new matter has been added.

Furthermore, the Examiner has objected the Abstract because “it recites the first claim of the application.” It is respectfully submitted that the Abstract should include an organization and operation of the invention if the claims are directed to an apparatus (see, **M.P.E.P. § 608.01(b)**). Nonetheless, the Abstract has been amended so as to describe the present invention more precisely. As such, Applicants submit that the Abstract complies with the requirement for the proper content of the disclosure.

For the reasons set forth below, Applicants respectfully submit that all pending claims are patentable over the cited prior art references.

II. The Objections Of The Drawings and Specification

The drawings are objected because they include reference signs not mentioned in the description. The Examiner asserts that reference characters 15 and 16 of Figs. 2, 4

and 6 have both been used to designate “Ethernet I/F Unit.” However, as readily illustrated, for example, in Figs. 1 and 2, reference character 15 is used to designate a “Ethernet I/F Unit” as a WAN I/F Unit, whereas reference character 16 is used to designate a “Ethernet I/F Unit” as a LAN I/F Unit. As such, it is respectfully submitted that the reference characters 15 and 16 are utilized to designate different types of Ethernet interface units.

The Examiner also asserts that reference characters 38 and 39 of Fig. 4, and 58 and 59 of Fig. 5 have been used to designate “Connector” and “Cable Connector.” However, reference character 38 is used to designate a “Connector” as part of an element of the network connection apparatus, whereas reference character 39 is used to designate a “Connector” as part of an element of the wireless LAN unit 43. Likewise, reference character 58 is used to designate a “Cable Connector” as part of an element of the network connection apparatus, whereas reference character 59 is used to designate a “Cable Connector” as part of an element of the wireless LAN unit 43. As such, it is respectfully submitted that the reference characters 38, 39, 58 and 59 are utilized to designate different types of connectors of different apparatus.

Also, the Examiner alleges that items 19 and 40 are not mentioned in the specification. However, it is respectfully submitted that the description for the foregoing reference signs can be found, for example, at page 13, lines 11-13, and page 10, lines 4-12. Applicants have also amended Fig. 13 to correct a typographical error indicated by the Examiner of wireless LAN unit to read as reference character “43.”

The Examiner further asserts that “there is no mention of memory LED or information LED.” However, as readily shown in Fig. 14, and at page 19, lines 1-8, the

display unit 3 is designed to flicker during operation of each interface unit. Specifically, when the acquired information is stored in the memory card 127, the display unit 3 lights up so as to judge whether the desired information is stored in the memory card 127. In other words, upon receiving information during operation of any given interface unit, the LED corresponding to the interface unit in operation, for example, “WAN,” “LAN,” “Phone Line,” “Wireless,” “AutoPilot,” and “Power,” lights up, thus signaling that the desired information was properly stored. As such, it is respectfully submitted that the display unit 3 is properly described in the specification.

III. The Rejection of The Claims Under 35 U.S.C. § 112, First Paragraph

Claim 7 is rejected under 35 U.S.C. § 112, first paragraph, for failing to comply with the enablement requirement. The Examiner asserts that “the claim recites transmission speed lessening means but is not disclosed in the disclosure.” However, it is respectfully submitted, in accordance with the present invention, if the transmission speed between the WAN I/F units 5-1 to 5-N and LAN I/F units 6-1 to 6-N is different, defects of information can be prevented, for example, by using a buffer memory when transmitting or receiving the information (see, e.g., page 6, line 25 to page 7, line 4 of the specification) so as to reduce or lessen the variation of the transmission speed. However, in an effort to advance the prosecution expeditiously, Applicants have amended claim 7 to recite that the second interface unit has buffer memory for reducing variation in transmission speed. It is respectfully submitted that the foregoing amendment to the claim, in conjunction with the foregoing explanation, which identifies the relevant portions of the specification that support

the claim terms questioned in the pending rejection, overcomes the pending rejection under 35 U.S.C. § 112, first paragraph.

IV. The Rejection of The Claims Under 35 U.S.C. § 112, Second Paragraph

Claim 10 is rejected under 35 U.S.C. § 112, second paragraph, for lacking antecedent basis. It is respectfully submitted that claim 10 has been amended to recite that one of the second interface units is a wireless interface unit separated from a main body of the network connection apparatus. Thus, the pending rejection to claim 10 under 35 U.S.C. § 112, second paragraph, has been overcome.

V. The Rejection of The Claims Under 35 U.S.C. § 102

Claims 1, 4-6, 8-9, 12-13, 15 and 17-28 are rejected under 35 U.S.C. § 102, as being anticipated by USP No. 6,584,096 to Allan. Applicants respectfully traverse this rejection for at least the following reasons.

Claims 1 and 12 relate to a network connection apparatus comprising: a first interface unit including at least one physical layer for connecting to an external network, a second interface unit including plural types of devices for connecting to an internal network, and a controller for controlling the first interface unit and the second interface unit, wherein the second interface unit is capable of independent operation from the first interface unit, and the controller transmits and receives information between the first interface unit and second interface unit, or between a plurality of second interface units.

Turning to the cited prior art, at a minimum, Allan does not disclose or suggest a first interface unit including at least one physical layer, a second interface unit including

plural types of physical layers, or a controller that transmits and receives information between the first interface unit and second interface unit, or between a plurality of second interface units, as recited by claims 1 and 12.

The Examiner asserts that the Home Gateway 12 of Allan corresponds to the claimed first interface unit and the second interface unit for exchanging information between the home network 10 and the internet 18. However, the Examiner has not expressly addressed which alleged element of the Home Gateway 12 corresponds to the at least one physical layer included in the first interface unit, and plural types of physical layers included in the second interface unit.

In contrast, in accordance with one embodiment of the present invention, the first interface unit includes an Ethernet interface unit as a WAN interface unit, while the second interface unit includes a wireless interface unit, an Ethernet interface unit, and a telephone line interface unit.

However, nowhere does Allan disclose or suggest connecting any WAN or LAN network devices. Indeed, Allan does not even appear to mention or recognize any types of Ethernet or wireless network devices. As such, at a minimum, Allan does not disclose or suggest at least one physical layer included in the first interface unit, and plural types of physical layers included in the second interface unit.

The Examiner further asserts that the Home Gateway 12 corresponds to the claimed controller for transmitting and receiving information between the second interface units. It is noted that the Examiner previously also alleges that the Home Gateway 12 corresponds to the claimed second interface unit. As such, it appears that the Examiner interprets the claims as transmitting and receiving information within the

Home Gateway 12, rather than between two distinct interface units as readily shown by the present invention. Nonetheless, nowhere does Allan disclose or suggest utilizing any controller for transmitting and receiving information between the home network devices 14 via the Home Gateway 12. Indeed, each port 16 is merely utilized for connecting the individual home network device to the Internet, rather than exchanging information among the home network devices 14 as asserted by the Examiner. Thus, at a minimum, Allan does not disclose or suggest a first interface unit including at least one physical layer, second interface unit including plural types of physical layers, or a controller that transmits and receives information between a plurality of second interface units, as recited by claims 1 and 12.

Further, claims 1 and 12, as amended, recite that the second interface unit is capable of independent operation from the first interface unit. The Examiner alleges that the Home Gateway 12 corresponds to both the first interface unit and a second interface unit. However, nowhere does Allan disclose or suggest that the alleged second interface unit is capable of independent operation from the alleged first interface unit. Indeed, since the Examiner alleged that the Home Gateway 12 corresponds to the first interface unit and the second interface unit, it is respectfully submitted that the foregoing interface units are incapable of independent operation. Thus, at a minimum, Allan does not disclose or suggest that the second interface unit is capable of independent operation from the alleged first interface unit.

Additionally, with regard to claim 12, this claim further recites an acquired information saver for saving information acquired from the external network, wherein the

controller acquires desired information by accessing the external network through the first interface unit, and saves the information in the acquired information saver.

In accordance with one embodiment of the present invention, the memory unit 4 is composed of a connection request information saver 941, and an acquired information saver 942. Specifically, a connection request sent from the client connected to the LAN I/F units 6-1 to 6-N and the external network is saved in the connection request information saver 941 via the controller 2. Then, on the basis of the information stored in the connection request information saver 941, the acquired information saver 942 acquires and saves any information downloaded automatically by the network connection apparatus into the memory unit 4 (see, e.g., page 15, line 5 to page 16., line 24).

Turning to Allan, the Examiner asserts that “the Home Gateway must have memory in order to process the data and connect the network devices to their ports and connect themselves to the Internet.” However, as discussed above, nowhere does Allan disclose or suggest a controller, let alone suggest that the controller acquires desired information by accessing the external network through the first interface unit. It is respectfully submitted that claim 12 is not only directed to saving isochronous data, but also recites an acquired information saver for saving information acquired from the external network, wherein the controller acquires desired information by accessing the external network through the first interface unit, and saves the information in the acquired information saver. It does not appear that Allan even mentions or recognizes saving any information in any memory, or accessing the alleged external network, or the Internet, and saves the information acquired in the acquired information saver. Thus, at a minimum, Allan does not disclose or suggest an acquired information saver for saving

information acquired from the external network, wherein the controller acquires desired information by accessing the external network through the first interface unit, and saves the information in the acquired information saver.

As anticipation under 35 U.S.C. § 102 requires that each element of the claim in issue be found, either expressly described or under principles of inherency, in a single prior art reference, *Kalman v. Kimberly-Clark Corp.*, 713 F.2d 760, 218 USPQ 781 (Fed. Cir. 1983), and at a minimum, Allan fails to disclose the foregoing claim elements, it is clear that Allan does not anticipate claims 1 and 12 and any of the claims dependent thereon within the meaning of 35 U.S.C. § 102.

VI. All Dependent Claims Are Allowable Because The Independent Claims From Which They Depend Are Allowable

Under Federal Circuit guidelines, a dependent claim is nonobvious if the independent claim upon which it depends is allowable because all the limitations of the independent claim are contained in the dependent claims, *Hartness International Inc. v. Simplimatic Engineering Co.*, 819 F.2d at 1100, 1108 (Fed. Cir. 1987). Accordingly, as claims 1 and 12 are patentable for the reasons set forth above, it is respectfully submitted that all claims dependent thereon are also in condition for allowance.

For all of the foregoing reasons, it is submitted that claims 2-11 and 13-28 are patentable over the cited prior art. Accordingly, it is respectfully requested that the rejections of claims 1, 4-6, 8-9, 12-13, 15 and 17-28 under 35 U.S.C. § 102 and claims 2-3, 10-11, 14 and 16 under 35 U.S.C. § 103 be withdrawn.

Furthermore, nowhere does Allan disclose or suggest that the information to be transmitted and received between said first interface unit and said second interface unit,

or between a plurality of second interface units includes isochronous data, as recited by claim 4, the controller exclusively controls said second interface unit, as recited by claim 6, said second interface unit has buffer memory for reducing variation in transmission speed, as recited by claim 7, said first interface unit incorporates a cable modem, as recited by claim 8, said first interface unit uses a telephone line and incorporates a modem, a connection request information saver for saving the connection request information from a client connected to said second interface unit, wherein said controller acquires the information to be saved in said acquired information saver by accessing the external network through said first interface unit on the basis of the information stored in said connection request information saver, as recited by claim 13, the information stored in said acquired information saver is isochronous data, as recited by claim 15, access information applying means for providing a client connected to said second interface unit with information about access, wherein said controller further provides said client with the information about access by said access information applying means when it is recognized that the client is connected to said second interface unit, as recited by claim 17, the number of IP addresses is variable, and the number of connected clients is controlled, as recited by claim 19, access information acquiring means for acquiring information about access from an Internet service provider connected through said first interface unit, wherein said controller further acquires the information about access from said access information acquiring means when it is recognized that said first interface unit is connected to the Internet service provider, as recited by claim 20, access information acquiring means acquires the information about access from said Internet service provider, relating to media access control (MAC) address of the client connected

to said second interface unit, as recited by claim 21, access information acquiring means for acquiring information about first access from an Internet service provider connected through said first interface unit, and access information applying means for providing a client connected to said second interface unit with information about second access, wherein said controller further acquires the information about first access from said access information acquiring means when it is recognized that said first interface unit is connected to the Internet service provider, and provides said client with the information about second access by said access information applying means when it is recognized that the client is connected to said second interface unit, as recited by claim 23, access information acquiring means acquires the information about access from said Internet service provider, relating to media access control (MAC) address of the client connected to said second interface unit, as recited by claim 24, the information about first access is a first IP address, and the information about second access is a second IP address, as recited by claim 25, the number of second IP addresses is variable, and the number of connected clients is controlled, as recited by claim 26, IP address varying means for translating said first IP address and second IP address, as recited by claim 27, or that the IP address varying means for translating said first IP address and second IP address, as recited by claim 28.

For all of the foregoing reasons, it is submitted that claims 2, 4-6, 8-9, 13, 15 and 17-28 are patentable over the cited prior art. Accordingly, it is respectfully requested that the rejections of claims 1, 4-6, 8-9, 12-13, 15 and 17-28 under 35 U.S.C. § 102 be withdrawn

VII. Conclusion

Accordingly, it is urged that the application is in condition for allowance, an indication of which is respectfully solicited.

If there are any outstanding issues that might be resolved by an interview or an Examiner's amendment, the Examiner is requested to call Applicants' attorney at the telephone number shown below.

To the extent necessary, a petition for an extension of time under 37 C.F.R. § 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

McDERMOTT WILL & EMERY LLP



Michael E. Fogarty
Registration No. 36,139

600 13th Street, N.W.
Washington, DC 20005-3096
(202) 756-8000 MEF/AHC
Facsimile: (202) 756-8087
Date: July 9, 2004



NETWORK CONNECTION APPARATUS

BACKGROUND OF THE INVENTION

RECEIVED

JUL 14 2004

Technology Center 2100

5

FIELD OF THE INVENTION

The present invention relates to a network connection apparatus for connecting a plurality of network terminals to an external network such as the Internet.

10

DESCRIPTION OF THE RELATED ART

Recently, along with the rapid spread of the Internet, there is a mounting need for connecting plural personal computers (PCs) at home or in small office to the Internet in batch.

Fig. 22 is a block diagram of a conventional network system, assuming a small office. Operation of the conventional network system when a PC 304a sends an electronic mail (E-mail) to outside is explained. The E-mail from the PC 304a is transmitted to the Internet 301 through a router 302. At this time, if a PC 304b attempts to access the Internet, transmission is
15 allowed when Ethernet 303, a transmission line, is free. However, while the line is busy as being used by the PC 304a, it is required to wait until free. When it is confirmed that the line is free, access to the Internet, an external network, is started.

Herein, information is transmitted and received by the
25 so-called CSMA/CD (carrier sense multiple access/collision

detect) system.

The clients, PC304a, 304b, 304c, can access the Internet at the same time, but the transmission speed is slower than when one unit accesses.

5 On the other hand, at home, plural information appliances such as AV apparatus, telephone, and facsimile equipment are used independently, and they are desired to be combined into a network.

10 However, in particular, if attempted to centralize plural PCs at home and connect to an external network, it is difficult to connect Ethernet wiring at home, and an easier and more flexible network system is needed.

SUMMARY OF THE INVENTION

15 The invention is intended to solve the problems of the prior art, and it is an object thereof to present an easy-to-use network connection apparatus capable of building up an easy and flexible network system by providing the user with plural types of interface.

20 To achieve the object, the network connection apparatus of the invention comprises a first interface unit including at least one physical layer for connecting to an external network, a second interface unit including plural physical layers for connecting to an internal network, and a controller for controlling the first
25 interface unit and second interface unit. The controller transmits

and receives information between the first interface unit and second interface unit, and between the second interface units.

BRIEF DESCRIPTION OF THE DRAWINGS

5 Fig. 1 is a block diagram of a network connection apparatus in embodiment 1 of the invention.

 Fig. 2 is a block diagram of a network connection apparatus in embodiment 2 of the invention.

 Fig. 3 is a block diagram of a network connection
10 apparatus in embodiment 3 of the invention.

 Fig. 4 is a block diagram of a network connection apparatus in embodiment 4 of the invention.

 Fig. 5 is a block diagram of a network connection apparatus in embodiment 5 of the invention.

15 Fig. 6 is a block diagram of a network connection apparatus in embodiment 6 of the invention.

 Fig. 7 is an appearance drawing of the network connection apparatus in embodiment 4 of the invention.

 Fig. 8 is an appearance drawing of wireless LAN unit to be
20 connected to the network connection apparatus in embodiment 4 of the invention.

 Fig. 9 is a flowchart of the network connection apparatus in embodiment 2 of the invention.

 Fig. 10 is a block diagram of a network connection
25 apparatus in embodiment 7 of the invention.

Fig. 11 is a block diagram of memory unit of the network connection apparatus in embodiment 7 of the invention.

Fig. 12 is a flowchart of automatic download of the network connection apparatus in embodiment 7 of the invention.

5 Fig. 13 is a block diagram of a network connection apparatus in embodiment 8 of the invention.

Fig. 14 is an appearance drawing of the network connection apparatus in embodiment 8 of the invention.

10 Fig. 15 is an appearance drawing of wireless LAN unit to be connected to the network connection apparatus in embodiment 8 of the invention.

Fig. 16 is a flowchart of automatic download of the network connection apparatus in embodiment 8 of the invention.

15 Fig. 17 is a block diagram of a network connection apparatus in embodiment 9 of the invention.

Fig. 18 is a block diagram of a network connection apparatus in embodiment 10 of the invention.

Fig. 19 is a block diagram of manager of the network connection apparatus in embodiment 10 of the invention.

20 Fig. 20 is an appearance drawing of the network connection apparatus in embodiment 10 of the invention.

Fig. 21 is an appearance drawing of wireless LAN unit to be connected to the network connection apparatus in embodiment 10 of the invention.

25 Fig. 22 is a block diagram of a conventional network

system.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to the drawings, preferred embodiments of
5 the invention are described in detail below.

(Embodiment 1)

Fig. 1 is a block diagram of a network connection
apparatus in a first embodiment of the invention.

10 As shown in Fig. 1, the network connection apparatus of
this embodiment comprises a manager 1, a controller 2, a display
unit 3, a memory unit 4, wide area network (WAN) interface (I/F)
units 5-1 to 5-N for connecting to an external network, and LAN
I/F units 6-1 to 6-N for connecting to an internal network.

15 The display unit 3 is composed of LCD, LED or other
display device, and lights up corresponding to the operating state
of the interface unit. The memory unit 4 is composed of
semiconductor memory, magnetic memory, or optical memory.

The WAN I/F units 5-1 to 5-N are composed of plural types
20 of physical layers. The LAN I/F units 6-1 to 6-N are also
composed of plural types of physical layers. The physical layers
are selected from the Ethernet, telephone line, optical fiber,
coaxial cable, powerline, and wireless means, and are applied in
each I/F unit. In the case of wireless means, radio wave or
25 infrared ray is used.

Data transmitted from the terminals connected to the LAN I/F units 6-1 to 6-N are transmitted to the external network through the WAN I/F units 5-1 to 5-N. To the contrary, data from the external network received through the WAN I/F units 5-1 to 5-N arrive at the terminals connected to the LAN I/F units 6-1 to 6-N. At this time, the controller 2 has a routing function, and converts the protocol or converts the address.

For example, data can be exchanged between the client connected to the LAN I/F unit 6-1 and the client connected to the LAN I/F unit 6-N. In this case, the physical layer of the LAN I/F unit 6-1 and the physical layer of the 6-N may be either same or different. In the case of the same physical layers, the controller 2 functions also as the hub. If the physical layers are different, the controller 2 functions as the bridge.

If the transmission speed is different, missing or other defect of information is eliminated by using a buffer memory or the like when transmitting or receiving the information, so that the system can be used without any sense of strangeness.

(Embodiment 2)

Fig. 2 is a block diagram of a network connection apparatus in embodiment 2 of the invention. In Fig. 2, same blocks and same functions as in Fig. 1 are identified with same reference numerals.

The physical layer of an Ethernet I/F unit 15 which is a

WAN I/F unit is Ethernet. By using an Ethernet interface, for example, the device to be connected can be used freely, such as cable modem or ADSL modem. Physical layers of wireless I/F unit 18, Ethernet I/F unit 16, and telephone line I/F unit 17, which
5 are LAN I/F units, are respectively wireless means, Ethernet, and telephone line. The data transmission speed of each LAN I/F unit is not slower than the Ethernet transmission speed of 10Mbps. Hence, data can be exchanged among the interfaces without delay of data. Accordingly, this embodiment is very effective for
10 transmission of isochronous data such as moving image and audio data.

Fig. 9 is a flowchart of the network connection apparatus in embodiment 2 of the invention.

The flowchart in Fig. 9 is explained below.

15 <Step 701>

Check if exclusive operation of I/F unit is set or not. If set, go to step 702.

<Step 702>

20 Check if operation I/F unit is selected or not. If selected, go to step 704. If not selected, go to step 703.

<Step 703>

Check automatic operation I/F unit, and go to step 704.

<Step 704>

Set operation of non-select I/F unit.

25 Two types of operation setting are prepared. In one, go to

step 705, and stop operation of non-select I/F. In other, go to step 706, and filter information from non-select I/F.

As mentioned above, of all LAN I/F units, the I/F unit in which data is actually flowing is detected, or the I/F unit to pass data in is designated, and therefore only the I/F unit in which data is actually flowing is controlled by the controller 2. In this manner, the processing load is lessened, and the data transfer efficiency is enhanced.

In the invention, the LAN I/F units are not limited to only this embodiment, and the types and number of physical layers of the I/F units are not specified.

(Embodiment 3)

Fig. 3 is a block diagram of a network connection apparatus in embodiment 3 of the invention. In Fig. 3, same blocks and same functions as in Fig. 2 are identified with same reference numerals.

A WAN I/F unit 25 incorporates a cable modem, and employs a coaxial cable I/F for CATV.

By incorporating the cable modem, the device to be connected to the WAN I/F unit is limited, but only the network connection apparatus of the invention may be installed. Besides, since the dial-up device for Internet connection is not required, the ease of installation is enhanced.

Moreover, by incorporating the function of set-top box for

CATV and cable modem, the ease of installation is further enhanced.

By incorporating the ADSL modem, instead of the cable modem, the telephone line I/F can be also achieved.

5 In the invention, the LAN I/F units are not limited to only this embodiment, and the types and number of physical layers of the I/F units are not specified.

(Embodiment 4)

10 Fig. 4 is a block diagram of a network connection apparatus in embodiment 4 of the invention. In Fig. 4, same blocks and same functions as in Fig. 2 are identified with same reference numerals.

A module controller 40, a wireless I/F unit 41, and a
15 connector 39 compose a modular wireless LAN unit 43.

In this embodiment, the LAN I/F is modularized in part or in whole, and is easy to attach and detach. For example, a detachable wireless LAN unit 43 is shown in Fig. 4. Since the LAN unit is detachable, if the I/F necessary for connection of
20 various information appliances at home is not complete from the beginning, it can be prepared later, and the flexible use is realized.

Besides, the necessary LAN I/F unit can be selected, and the expensive wireless LAN unit 43 may be omitted because it is
25 an optional I/F, so that the cost of the main body of the network

connection apparatus can be saved. For example, by using the connectors 38, 39 conforming to the PC card standard (PCMCIA standard), the modular wireless LAN unit 43 may be realized by a device having a PC card slot, for example, a laptop computer, so
5 that the versatility is improved.

Further, as in the embodiment, by installing a controller 40 also at the wireless LAN unit 43 side, the processing load can be distributed. Hence, the processing load of the controller 2 can be lowered.

10 Fig. 7 is an appearance drawing of the network connection apparatus in embodiment 4 of the invention. In the diagram, those corresponding to the parts in Fig. 4 are identified with same reference numerals, and their description is omitted.

An eject button 44 is for ejecting the wireless LAN unit 43.
15 A lid 45 covers the wireless LAN unit 44 installed in the main body. A changeover switch 46 changes over the PC or hub connected to the Ethernet I/F. Generally, depending on the device at the destination of connection, the user must selectively use either the straight cable or the cross cable, but the same cable
20 can be used by means of the changeover switch 46.

If the user wishes to connect in the transmission-reception relation such as direct connection of the terminal and the network connection apparatus, the changeover switch 46 is connected to the "cross" side. Or when connecting the network connection
25 apparatus to the hub, the changeover switch 46 is connected to the

"straight" side, so that it is not required to prepare cross type and straight type cables, and it is convenient for the user.

The display unit 3 is designed to flicker during operation of each I/F. As shown in Fig. 7, all other I/Fs than the I/F for the optional wireless LAN unit 43 are disposed at one side of the network connection apparatus. This is considered for the ease of bundling the connection wires used in the network, so as not to disturb the connection wires used in the network, assuming the environment of use at home or small office.

A lid 45 for cover of the wireless LAN unit is provided to avoid unexpected impact on the wireless LAN unit 43.

Fig 8 is an appearance drawing of the wireless LAN unit used in the network connection apparatus in embodiment 4 of the invention. The modular wireless LAN unit 43 has a connector 39 conforming to the PC card standard. Hence, it can be used by other device having PC card slot, than the network connection apparatus of the invention, such as a laptop computer, so that the versatility is further enhanced.

In a different structure, the controller 40 may be omitted in the wireless LAN unit 43.

In the invention, the LAN I/Fs are not limited to only this embodiment, and the types and number of physical layers of the I/Fs are not specified.

(Embodiment 5)

Fig. 5 is a block diagram of a network connection apparatus in embodiment 5 of the invention. In Fig. 5, same blocks and same functions as in Fig. 4 are identified with same reference numerals. In this embodiment, the wireless LAN unit
5 43 is connected to the main body by means of cable. For this purpose, a cable connector 58 and a cable connector 59 are provided respectively at the main body side and the wireless LAN unit side.

Hence, the wireless I/F 41 can be separated from the main
10 body, and there is a degree of freedom in its installation. On the radio waves propagating in the air, in order to minimize the effects from obstacles, it is preferred to install the wireless unit in a free space, which is realized in the embodiment.

The degree of freedom of installation may be further
15 enhanced by separating the antenna 19 from the wireless LAN unit, or by installing other antenna.

In the invention, the LAN I/F units are not limited to only this embodiment, and the types and number of physical layers of the I/F units are not specified.

20

(Embodiment 6)

Fig. 6 is a block diagram of a network connection apparatus in embodiment 6 of the invention. In Fig. 6, same blocks and same functions as in Fig. 2 are identified with same
25 reference numerals. In addition to the structure in Fig. 2, a

master unit 80 of a cordless telephone having an antenna 81 is further provided.

In this embodiment, the data and audio can be processed by integrating. In the case the WAN I/F is an Ethernet I/F 15 for transmitting data, the audio signal is once A/D converted, and is converted into a packet so as to be passed into the Ethernet, and processed same as the data, so that the function of the Internet telephone (LAN telephone) is realized.

Or, when the WAN I/F unit has a telephone line, the audio signal can be transmitted and received in the WAN I/F unit directly as analog signal.

Besides, the wireless I/F unit and wireless unit may be shared, or the antenna unit may be shared.

Further having the facsimile function and others, it is very useful as the network connection apparatus for home and small office for transmitting and receiving information.

The user can build up simple and flexible network system only by installing the network connection apparatus of the invention.

In the invention, the LAN I/F units are not limited to only this embodiment, and the types and number of physical layers of the I/F units are not specified.

(Embodiment 7)

Fig. 10 is a block diagram of a network connection

apparatus in embodiment 7 of the invention. The block structure in Fig. 10 is same as in Fig. 1, and its description is omitted.

Fig. 11 is a block diagram of a memory unit 104 4 of the network connection apparatus in embodiment 7 of the invention.

5 The memory unit 104 4 is composed of two blocks, that is, a connection request information saver 941, and an acquired information saver 942. The information (URL, address, etc.) of connection request from the client connected to the LAN I/F units 106-1 ~~6-1~~ to 106-N ~~6-N~~ of the network connection apparatus to
10 the external network is saved in the connection request information saver 941 through the controller 102 2. The acquired information saver 942 saves the information downloaded automatically by the network connection apparatus on the basis of the information stored in the connection request information saver
15 941.

Operation of automatic downloading is explained below.

Fig. 12 is a flowchart of automatic download of the network connection apparatus in embodiment 7 of the invention.

The flowchart shown in Fig. 12 is explained below.

20 <Step 801>

The manager 101 1 checks if information is saved in the connection request information saver 941 or not. Go to step 802 if set information is found.

<Step 802>

25 At a predetermined timing, execute automatic operation to

acquire data automatically from the external network connected to the WAN I/F units 105-1 ~~5-1~~ to 105-N ~~5-N~~. Acquire the demanded address or URL information.

<Step 803>

- 5 Check if acquired information is found or not as a result of automatic operation. If information is not acquired due to some error, return to step 802. When information is acquired, go to step 804.

<Step 804>

- 10 Save acquired data in the memory unit 104 4, and go to step 805.

<Step 805>

As required, presence or absence of acquired data is displayed in the display unit 103 3.

- 15 Accordingly, for example, the data can be automatically acquired in the time zone of low connection charge, or the data can be received without starting up the computer.

Moreover, by temporarily storing isochronous data such as audio and video in the memory unit 104 4, the user can reproduce
20 the data without having effects of data delay due to communication.

(Embodiment 8)

- Fig. 13 is a block diagram of a network connection
25 apparatus in embodiment 8 of the invention. The block structure

in Fig. 13 is same as in Fig. 4, and its description is omitted.

In this embodiment, the LAN I/F unit is modularized in part or in whole, and is easy to attach and detach. For example, same as in embodiment 4, a wireless LAN unit 43 ~~163~~ is
5 detachable, and the same operation and effect are obtained.

Fig. 14 is an appearance drawing of the network connection apparatus in embodiment 8 of the invention. Same or nearly same parts as shown in Fig. 7 are identified with same reference numerals.

10 A memory card 13-127 ~~127~~ is modularized, and is detachable from the main body. The memory card 13-127 ~~127~~ can be inserted into a memory card slot 13-128 ~~128~~. By pressing an eject button 13-129 ~~129~~, the inserted memory card 13-127 ~~127~~ can be ejected from the main body.

15 The memory card 13-127 ~~127~~ may include both blocks of connection request information saver 941 and acquired information saver 942 same as explained in embodiment 7. Or only the acquired information saver 942 may be provided.

In the case of the memory card 13-127 ~~127~~ having two
20 blocks of connection request information saver 941 and acquired information saver 942, the memory card 13-127 ~~127~~ is inserted into the laptop PC or the like not connected to the network connection apparatus of the invention, and the information (URL, address, etc.) of connection request is written into the connection
25 request information saver 941. Consequently, inserting into the

memory card slot 13-128 ~~128~~ of the network connection apparatus,
auto-pilot is executed, and the acquired information is stored in
the acquired information saver 942. Again, the card 13-127 ~~127~~
is inserted into the laptop PC or the like not connected to the
5 network connection apparatus, and the information can be
reproduced.

In the case of the memory card 13-127 ~~127~~ including the
acquired information saver 942 only, by inserting the memory card
13-127 ~~127~~ into other portable music reproducing device or
10 portable video reproducing device depending on the acquired
information, the information can be reproduced. In this case,
since the connection request information saver 941 is not present
in the memory card 13-127 ~~127~~, more information can be stored
effectively.

15 The memory card 13-127 ~~127~~ may be a memory card
conforming to the PC card standard. In addition, Compact-Flash
card, Smart-media card, SD card and others may be properly used,
and not limited to the semiconductor, but ultra-small removable
hard disk drive, magneto-optical disk and others may be used.

20 The display unit 133 ~~3~~ is designed to flicker during
operation of each I/F. Besides, when the acquired information is
stored in the memory card 13-127 ~~127~~, the display unit 133 ~~3~~
lights up. Hence, at a glance, it can be judged whether the
desired information is stored in the memory card 13-127 ~~127~~ or
25 not. Moreover, as the display, the LCD and other display device

can be used, and the display information can be increased.

As clear from the drawing, all other I/Fs than the I/F for the optional wireless LAN unit 13-43 ~~43~~ are disposed at one side of the network connection apparatus. This is considered for the ease of bundling the connection wires used in the network, so as not to disturb the connection wires used in the network, assuming the environment of use at home or small office.

Fig. 15 is an appearance drawing of wireless LAN unit to be connected to the network connection apparatus in embodiment 8 of the invention. The wireless LAN unit shown in Fig. 15 is same as the one shown in Fig. 8, and it has the same operation and effect as in embodiment 4.

In a different structure, the controller may be omitted in the wireless LAN unit 13-43 ~~43~~.

In the invention, the LAN I/F units are not limited to only this embodiment, and the types and number of physical layers of the I/Fs are not specified.

Operation of automatic downloading is explained below. Fig. 16 is a flowchart of automatic download of the network connection apparatus in embodiment 8 of the invention.

The flowchart shown in Fig. 16 is explained below.

<Step 851>

The manager1 checks if the memory card 13-127 ~~127~~ is inserted in the memory card slot 13-128 ~~128~~ or not. If inserted, go to step 852.

<Step 852>

Check if set information is saved in the connection request information saver 941 or not. If saving is confirmed, go to step 853.

5 <Step 853>

If information is found, at a predetermined timing, execute automatic operation to acquire data automatically from the external network connected to the WAN I/F unit 13-15 ~~15~~. Acquire the demanded address or URL information.

10 <Step 854>

Check if acquired information is found or not as a result of automatic operation. If information is not acquired due to some error, return to step 853. When information is acquired, go to step 856.

15 <Step 855>

Save acquired data in the memory card 13-127 ~~127~~, and go to step 856.

<Step 856>

20 Presence or absence of acquired data is displayed in the display unit 133 ~~3~~.

Accordingly, for example, the data can be automatically acquired in the time zone of low connection charge, or the data can be received without starting up the computer.

Moreover, by storing data in the detachable memory card
25 13-127 ~~127~~, the downloaded information can be reproduced by

inserting into the portable music reproducing device or portable video reproducing device.

(Embodiment 9)

5 Fig. 17 is a block diagram of a network connection apparatus in embodiment 9 of the invention. The block structure in Fig. 17 is same as in Fig. 1, and its description is omitted.

The operation of the network connection apparatus in embodiment 9 is described below.

10 The manager 171 ~~4~~ has a function of automatically acquiring the global IP address from an Internet service provider (ISP) connected through the WAN I/F unit. It also has a function of automatically providing the client connected to the LAN I/F units 176-1 ~~6-1~~ to 176-N ~~6-N~~ with the information about access
15 such as private IP address preliminarily set in the network connection apparatus main body, sub-net mask, and gateway address. At this time, the manager 171 ~~4~~ converts the global IP address into IP address and vice versa, so that one global IP address can be shared by plural clients connected to the LAN I/F
20 unit 176-1 ~~6-1~~ to 176-N ~~6-N~~.

Or, by varying the number of private IP addresses, the number of clients to be connected can be controlled, and the communication data quantity can be limited, so that a stable communication is realized.

25 As required, it also has a function of setting the global IP

address acquired from the ISP directly in the client. The user can hence execute the application requiring the global IP address. If plural global IP addresses are acquired, the global IP address may be given directly to the client, or it may be shared among the
5 connected clients.

In this case, the global IP address acquired from the ISP is usually assigned for one media access control (MAC) address. Hence, the network apparatus of the invention has a function of acquiring plural global IP addresses by automatically acquiring
10 the MAC address of the connected client, so that it may seem that there are plural MAC addresses for the ISP.

In the invention, the LAN I/F units are not limited to this embodiment alone, and the types and number of physical layers of the I/Fs are not specified.

15

(Embodiment 10)

Fig. 18 is a block diagram of a network connection apparatus in embodiment 10 of the invention. The block structure in Fig. 18 is same as in Fig. 4, and has the same
20 operation and effect as in embodiment 4.

Fig. 19 is a block diagram of manager 181 + of the network connection apparatus in embodiment 10 of the invention.

The manager 181 + in this embodiment includes DHCP client 2301 and DHCP server 2302. The DHCP client 2301 is
25 connected to the server of the ISP (not shown) through the WAN

side Ethernet I/F unit 18-15 ~~45~~. By collaboration with the DHCP (dynamic host configuration protocol) server function that is the function in this server, the IP address is acquired automatically by accessing to the ISP.

5 The DHCP server 2302 is connected to the client (not shown) by way of the LAN side I/F, that is, the LAN side Ethernet I/F unit 18-16 ~~46~~, telephone line I/F unit 18-17 ~~47~~, and wireless I/F unit 18-41 ~~44~~. It has the function as the DHCP server by providing this client with IP address, sub-net mask, gateway
10 address, and other information about the access.

Fig. 20 is an appearance drawing of the network connection apparatus in embodiment 10 of the invention. The appearance of the network connection apparatus shown in Fig. 20 is same as in Fig. 7, and the operation and effect are also the same.

15 Fig. 21 is an appearance drawing of wireless LAN unit to be connected to the network connection apparatus in embodiment 10 of the invention. The outline of the wireless LAN unit shown in Fig. 21 is same as shown in Fig. 8, and the operation and effect are also the same.

20 The operation of the network connection apparatus of embodiment 10 is explained.

The DHCP client 2301 of the manager 181 ~~+~~ automatically acquires the global IP address from the DHCP server of the ISP connected through the WAN side Ethernet I/F unit 18-15 ~~45~~. The
25 DHCP server 2302 of the manager 181 ~~+~~ automatically provides

the client connected through the LAN side I/F, that is, the Ethernet I/F unit 18-16 ~~16~~, telephone line I/F unit 18-17 ~~17~~, and wireless I/F unit 18-41 ~~41~~, with the information about the access preliminarily set in the main body of the network connection apparatus such as private IP address, sub-net mask and gateway address. At this time, the manager 181 ~~1~~ converts the global IP address into private IP address and vice versa, so that one global IP address can be shared by plural clients connected through the Ethernet I/F unit 18-16 ~~16~~, telephone line I/F unit 18-17 ~~17~~, and wireless I/F unit 18-41 ~~41~~.

Besides, by varying the number of private IP addresses, and limiting the number of clients to be connected, the communication data quantity can be limited, so that stable communication is possible.

It has also a function of setting the global IP address acquired from the ISP as required, directly to the connected client. The user can execute the application requiring the global IP address. If plural global IP addresses are acquired, the global IP address may be directly given to the client, or it may be shared by connected clients.

In this case, usually, the global IP address acquired from the ISP is assigned to one MAC address. Hence, the network connection apparatus of the invention has a function of acquiring plural global IP addresses by automatically acquiring the MAC address of the connected client, so that it may appear that there

are plural MAC addresses for the ISP.

In the invention, the LAN I/F unit are not limited to only this embodiment, and the types and number of physical layers of the I/Fs are not specified.

5 According to the invention, as described herein, it comprises a first interface including at least one physical layer for connecting to an external network, a second interface including plural physical layers for connecting to an internal network, and a controller for controlling the first interface and
10 second interface. The controller transmits and receives information at least between the first interface and second interface, or between the second interfaces. Accordingly, it is applicable to the interface for connecting to an external network, and plural types of interface about an internal network, so that an
15 easy and flexible network system can be built up.

Isochronous information such as video and audio can be smoothly transmitted and received.

When transmitting and receiving information in the internal network, it can be used without any sense of strangeness.

20 By modularizing the second interface, the interface necessary for connecting various information appliances at home can be prepared only when necessary, and such flexible use is possible. A necessary LAN interface unit can be selected. Further, an expensive interface such as wireless LAN unit is used
25 only optionally, so that the cost of the main body of the network

connection apparatus can be saved.

Further, by modularizing according to the PC card standard, the modularized interface unit can be used in the device having a PC card slot, such as a laptop computer, so that the versatility is enhanced.

According to the invention, further comprising the acquired information saver for saving the information acquired from the external network, the controller can transmit and receive information between the first interface unit and second interface unit, and between the second interface units, and also controls to acquire desired information by accessing the external network through the first interface unit, and save in the acquired information saver. Hence the information once acquired can be reproduced, reviewed and checked later.

Further comprising the connection request information saver for saving the connection request information from the client connected to the second interface unit, regardless of connection of the client, the desired information can be acquired by accessing the external network through the first interface unit, and accordingly, for example, the data can be automatically acquired in the time zone of low connection charge, or the data can be received without starting up the computer.

Moreover, by storing the downloaded information in the memory card, by inserting into portable music reproducing device or portable video reproducing device depending on the acquired

information, the information can be reproduced.

Also according to the invention, comprising also the access information applying means for providing the client connected to the second interface unit with the information about the access, 5 the controller provides the client with the access information by the access information applying means when it is recognized that the client is connected to the second interface unit. Hence, the terminal connected to the network connection apparatus is automatically provided with the access information, so that the 10 network can be built up easily without requiring any complicated setting operation.